

IN THE CLAIMS:

1. (previously presented) A method of replacing a portion of a gas turbine engine rotor blade, the rotor blade having an original blade contour defined by a blade first sidewall and a blade second sidewall, said method comprising:

cutting through the rotor blade such that a cut line extends from a leading edge of the blade to a trailing edge of the blade and between the first sidewall and the second sidewall, and such that the cut line extends at least partially through a hollow portion of the blade defined between the first and second sidewalls;

removing the portion of the rotor blade that is radially outward of the cut line; and

coupling, with resistance welding, a replacement blade portion to a remaining blade portion with a single-pass weld using a welding material that includes at least one of a nickel alloy and a titanium alloy to form a single weld joint extending along the cut line such that a newly formed rotor blade is formed with an aerodynamic contour that is one of an improvement in aerodynamic performance over the original blade contour and mirroring the original blade contour.

2. (cancelled)

3. (previously presented) A method in accordance with Claim 1 further comprising machining the weld to a desired finished dimension.

4. (previously presented) A method in accordance with Claim 1 further comprising automatically welding the replacement blade portion to the remaining blade portion.

5. (previously presented) A method in accordance with Claim 1 wherein coupling a replacement blade portion further comprises coupling a replacement blade portion to the remaining blade portion such that the replacement blade portion and the remaining blade portion are fabricated from a substantially similar material including at least one of a nickel alloy, a titanium alloy, and an iron alloy.

6. (previously presented) A method in accordance with Claim 1 wherein cutting through the rotor blade comprises cutting through at least one of a compressor rotor blade and a turbine rotor blade.

7. (cancelled)

8. (withdrawn) A method for replacing a portion of a gas turbine engine rotor blade, the rotor blade including a leading edge, a trailing edge, a first sidewall, and a second sidewall, and having a contour defined by the first sidewall and the second sidewall, said method comprising:

uncoupling the rotor blade from the gas turbine engine;

cutting through the rotor blade such that a cut line extends from the leading edge to the trailing edge, and between the first sidewall and the second sidewall and such that the cut line extends at least partially through a cooling cavity defined within the blade;

removing the portion of the rotor blade radially outward of the cut line;

coupling a replacement blade portion to the remaining blade portion; and

contouring the replacement blade portion such that a newly formed rotor blade is formed with a predetermined aerodynamic contour.

9. (withdrawn) A method in accordance with Claim 8 wherein coupling a replacement blade portion further comprises welding the replacement blade portion to the remaining blade portion.

10. (withdrawn) A method in accordance with Claim 9 wherein coupling a replacement blade portion further comprises automatically welding the replacement blade portion to the remaining blade portion.

11. (withdrawn) A method in accordance with Claim 8 wherein coupling a replacement blade portion further comprises coupling a replacement blade portion to the remaining blade portion that is fabricated from a material that is the same material used in fabricating the original rotor blade.

12. (withdrawn) A method in accordance with Claim 8 wherein cutting through the rotor blade further comprises cutting through a least one of a compressor rotor blade and a turbine rotor blade.

13. (withdrawn) A method in accordance with Claim 8 wherein coupling a replacement blade portion to a remaining blade portion further comprises coupling the replacement blade portion to the remaining blade portion using a single weld joint extending along the cut line.

14. (withdrawn) A method in accordance with Claim 8 further comprising coupling the replacement blade portion to the remaining blade portion using at least one of a nickel alloy, a titanium alloy, and an iron alloy.

15. (withdrawn) A method for replacing a damaged portion of a gas turbine engine rotor blade, the rotor blade including a leading edge, a trailing edge, a first sidewall, and a second sidewall, and having an original compressor rotor blade contour defined by the first sidewall and the second sidewall, said method comprising:

uncoupling a compressor rotor blade from the gas turbine engine;

cutting through a portion of the damaged rotor blade such that a cut line extends from the leading edge to the trailing edge, and between the first sidewall and the second sidewall, and such that the cut line extends at least partially through a cooling cavity defined between the first and second sidewalls;

removing a portion of the damaged rotor blade extending radially outward of the cut line;

welding a replacement blade portion to the remaining blade portion; and

contouring the replacement blade portion such that the newly formed compressor rotor blade has a contour that substantially mirrors that of the original compressor rotor blade contour.

16. (withdrawn) A method in accordance with Claim 15 wherein welding a replacement blade portion to the remaining blade portion further comprises automatically welding the replacement blade portion to the remaining blade portion.

17. (withdrawn) A method in accordance with Claim 15 wherein welding a replacement blade portion to the remaining blade portion further comprises coupling a replacement blade portion to the remaining blade portion that is fabricated from a material that is the same material used in fabricating the original rotor blade.

18. (withdrawn) A method in accordance with Claim 15 wherein welding a replacement blade portion to the remaining blade portion further comprises welding the replacement blade portion to the remaining blade portion using a single weld joint along the cut line.

19. (withdrawn) A method in accordance with Claim 15 wherein welding a replacement blade portion to the remaining blade portion further comprises welding the replacement blade portion to the remaining blade portion using at least one of a nickel alloy and a titanium alloy.

20. (withdrawn) A method in accordance with Claim 15 further comprising rough blending the welded replacement portion and final blending the welded replacement portion such that the newly formed compressor rotor blade has a contour that substantially mirrors that of the original compressor rotor blade contour.

21. (cancelled)

22. (previously presented) A method in accordance with Claim 1 further comprising:

rough blending the welded replacement portion; and

final blending the welded replacement blade portion.